

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) A projection exposure apparatus for projecting a pattern image formed on a mask onto a photosensitive substrate through a projection optical system to form a projected image thereon, the projection exposure apparatus comprising:

a substrate position detector that detects a position of a registration mark formed on the substrate;

an imagery characteristic correction mechanism coupled with the projection optical system that drives the projection optical system to correct an imagery characteristic of the projection optical system;

an image-forming displacement detector communicating with said imagery characteristic correction mechanism, said image-forming displacement detector determining a displacement amount of an image-forming position of the projected image in accordance with a driven amount of the projection optical system by said imagery characteristic correction mechanism; and

an alignment signal processor communicating with said substrate position detector and said image-forming displacement detector, said alignment signal processor correcting the detection result of the substrate position detector based on the displacement amount of the image-forming position obtained by the image-forming displacement detector.

2. (Original) The projection exposure apparatus of claim 1, further comprising a memory storing a relation between the driven amount of the projection optical system by said imagery characteristic correction mechanism and the displacement amount of the image-forming position, said image-forming displacement detector communicating with said memory.

3. (Original) The projection exposure apparatus of claim 2, wherein said projection optical system comprises the mask and at least one optical element that projects the pattern image formed on the mask onto the photosensitive substrate, said imagery characteristic correction mechanism having a driving device coupled to the mask and said optical element, said driving device driving or tilting at least one of the mask or said optical element along an optical axis direction of the projection optical system or with respect to a plane perpendicular to the optical axis.

4. (Currently Amended) The projection exposure apparatus of claim 2, further comprising a pressure adjustment mechanism communicating with said imagery characteristic correction mechanism, said projection optical system comprising at least two optical elements disposed along ~~the~~an optical axis, said optical elements defining a sealed space therebetween, wherein said imagery characteristic correction mechanism controls said gas pressure adjustment mechanism to change a gas pressure in said sealed space.

5. (Original) The projection exposure apparatus of claim 1, wherein said projection optical system comprises the mask and at least one optical element that

projects the pattern image formed on the mask onto the photosensitive substrate, said imagery characteristic correction mechanism having a driving device coupled to the mask and said optical element, said driving device driving or tilting at least one of the mask or said optical element along an optical axis direction of the projection optical system or with respect to a plane perpendicular to the optical axis.

6. (Currently Amended) The projection exposure apparatus of claim 1, further comprising a pressure adjustment mechanism communicating with said imagery characteristic correction mechanism, said projection optical system comprising at least two optical elements disposed along the an optical axis, said optical elements defining a sealed space therebetween, wherein said imagery characteristic correction mechanism controls said gas pressure adjustment mechanism to change a gas pressure in said sealed space.

7. (Original) The projection exposure apparatus of claim 1, further comprising at least one displacement detector secured to the projection optical system and communicating with said image-forming displacement detector, said displacement detector detecting the driven amount of the projection optical system by said imagery characteristic correction mechanism.

8. (Original) The projection exposure apparatus of claim 1, further comprising an environmental sensor disposed adjacent the projection optical system and communicating with said imagery characteristic correction mechanism.

9. (Currently Amended) A projection exposure apparatus for projecting a pattern image of a mask through a projection optical system onto a photosensitive substrate to form a projected image thereon, the projection exposure apparatus comprising:

a substrate position detector that detects a position of a registration mark formed on the substrate;

an imagery characteristic correction mechanism coupled with the projection optical system that drives the projection optical system to correct an imagery characteristic of the projection optical system;

a base-line amount measuring device that measures a distance between a detection center of said substrate position detector and a center of the projected image formed through the projection optical system, said distance defining a base-line amount; and

an alignment signal processor communicating with said substrate position detector and said base-line amount measuring device, said alignment signal processor correcting ~~the detection result of the substrate position detector based on the base-line amount~~ based on a driven amount of the projection optical system by the imagery characteristic correction mechanism.

10. (Original) The projection exposure apparatus of claim 9, wherein said base-line amount measuring device comprises a reference plate disposed adjacent and substantially level with the photosensitive substrate, said reference plate including primary alignment marks corresponding to alignment marks on the mask.

11. (Original) The projection exposure apparatus of claim 10, wherein said reference plate includes a secondary alignment mark disposed adjacent said substrate position detector during initial alignment, said substrate position detector determining an offset amount in accordance with a distance between a center point between said primary alignment marks and said secondary alignment mark.

12. (Original) The projection exposure apparatus of claim 10, wherein said base-line amount measuring device further comprises a pair of mask alignment microscopes, said mask alignment microscopes being disposed adjacent the alignment marks on the mask for detecting the alignment marks on the mask.

Claims 13-31 (Canceled)

32. (Previously Presented) The projection exposure apparatus of claim 1, wherein the projection optical system comprises a first lens element and a second lens element, the imagery characteristic correction mechanism having a first drive to drive the first lens element and a second drive to drive the second lens element.

33. (Previously Presented) The projection exposure apparatus of claim 1, wherein the projection exposure apparatus is a scanning type projection exposure apparatus.

34. (Previously Presented) The projection exposure apparatus of claim 9, wherein the projection optical system comprises a first lens element and a second lens element, the imagery characteristic correction mechanism having a first drive to drive the first lens element and a second drive to drive the second lens element.

35. (Previously Presented) The projection exposure apparatus of claim 9, wherein the projection exposure apparatus is a scanning type projection exposure apparatus.

36. (Currently Amended) A projection exposure apparatus that projects a pattern onto a substrate through a projection optical system, the projection exposure apparatus comprising:

an imagery characteristic correction mechanism coupled with the projection optical system that drives at least part of the projection optical system to correct an imagery characteristic of the projection optical system;

an error detector communicating with said imagery characteristic correction mechanism, said error detector determining a projection error of the pattern in accordance with a driven amount of the projection optical system by said imagery characteristic correction mechanism; and

a movable stage that retains the substrate; and

a correction mechanism connected to the error detector, the correction mechanism controlling a position of the stage to correct the projection error.

37. (Previously Presented) The projection exposure apparatus of claim 36, wherein the detector comprises a memory to store a relation between the driven amount the projection optical system and the projection error of the pattern.

38. (Previously Presented) The projection exposure apparatus of claim 36, wherein the imagery characteristic correction mechanism comprises a plurality of actuators to drive at least part of the projection optical system.

39. (Previously Presented) The projection exposure apparatus of claim 36, wherein the projection optical system comprises a first lens element and a second lens element, the imagery characteristic correction mechanism having a first drive to drive the first lens element and a second drive to drive the second lens element.

40. (Previously Presented) The projection exposure apparatus of claim 36, wherein the projection exposure apparatus is a scanning type projection exposure apparatus.